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A4F FAMC

(56) Documents Cited

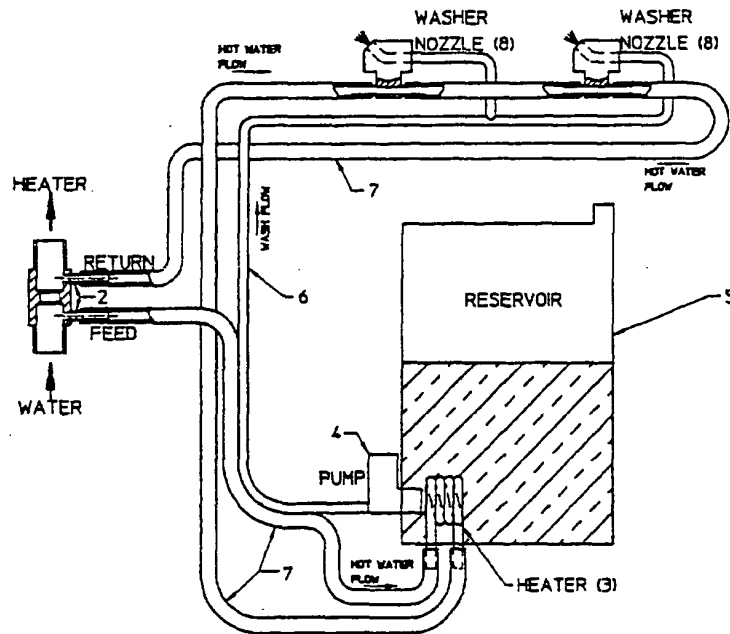
GB 2271276 A US 4700424 A US 4090668 A  
US 3888412 A

(58) Field of Search

UK CL (Edition O ) A4F FAMC FAMD  
INT CL<sup>6</sup> B60S 1/48

## (54) Vehicle windscreen washer system

(57) A windscreen washer de-icer system utilises a device, eg a restricted orifice sited in a vehicle's engine cooling system, to provide a pressure difference to cause hot water to flow to and through a heater (3) incorporated in or close to the windscreen washer system. The heater (3) feed pipe is utilised to provide trace heating to the windscreen washer delivery pipe. The heater (3) return flow is routed via the washer fluid nozzles (8) to heat them.



### WINDSCREEN WASHER SYSTEMS

This invention relates to vehicle windscreen washer systems and more especially to a system for applying heat to windscreen washer fluid to thaw the same in the event of freezing.

During cold weather, windscreen washer systems of motor vehicles are frequently rendered inoperative for extended periods of time because of freezing of washer fluid in the holding reservoir. This can cause acute driver vision problems because any accumulated dirt on the windscreen cannot be washed away.

This invention sets out to provide a windscreen washer system which does not suffer from, or at least alleviates, this problem.

According to the present invention there is provided a vehicle windscreen washer system which comprises means for causing heated water from the vehicle's cooling system to

be conveyed to and through a heating element positioned at or adjacent to a pump for moving fluid from a washer fluid containing reservoir to nozzles through which the washer fluid is discharged onto the windscreen of the vehicle. The heating element may be positioned within the reservoir or externally of the reservoir. The element may comprise a coil of relatively non-corrosive material and may communicate with the vehicle's cooling system through flexible piping, eg of plastics or rubber. Two such pipes may be provided, one for conveying fluid to an inlet of the heating coil and a second for returning fluid from an outlet of the heating coil back to the vehicle's cooling system via the washer fluid nozzles.

A restricted orifice device is positioned in the cooling system between the connections of the piping to the cooling system.

In one arrangement, the coil is located within the reservoir next to the inlet to the pump. In another arrangement, the coil is positioned next to or around the connection between the reservoir and the pump. In a further arrangement, the coil is wound around the periphery of the reservoir housing.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawings.

As shown in the drawing, an orifice (1) having a restricted passageway is sited in the hose which carries water from the engine water pump to the cabin heater of the vehicle. Bleed tubes (2) sited on either side of the orifice (1) utilise the pressure drop across the restricted orifice to cause hot water to be conveyed to a heater (3) in the form of a coil located in close proximity to the inlet of a windscreen washer pump (4) which conveys washer fluid from a reservoir (5) through a hose (6) to the nozzles through which washer fluid is directed onto the vehicle's windscreen. The hot water is carried by flexible hoses (7). One of the hoses (7) is routed adjacent to the hose (6) to provide an additional heating effect.

The heater coil (3) and the close proximity of the hoses (6, 7) ensures that frozen fluid present within the reservoir of the hose (6) is quickly thawed by heat generated within the cooling system of the vehicle's engine. Routing the return pipe through the body of the washer fluid nozzles (8) ensures that these are also thawed of any ice.

It will be appreciated that the foregoing is merely exemplary of systems in accordance with the invention and that modifications can readily be made thereto without departing from the scope of the invention.

As shown in the drawing, an orifice (1) having a restricted passageway is sited in the hose which carries water from the engine water pump to the cabin heater of the vehicle. Bleed tubes (2) sited on either side of the orifice (1) utilise the pressure drop across the restricted orifice to cause hot water to be conveyed to a heater (3) in the form of a coil located in close proximity to the inlet of a windscreen washer pump (4) which conveys washer fluid from a reservoir (5) through a hose (6) to the nozzles through which washer fluid is directed onto the vehicle's windscreen. The hot water is carried by flexible hoses (7). One of the hoses (7) is routed adjacent to the hose (6) to provide an additional heating effect.

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It will be appreciated that the foregoing is merely exemplary of systems in accordance with the invention and that modifications can readily be made thereto without departing from the scope of the invention.

CLAIMS

1. A small bleed off of hot water is taken from the engine cooling system and circulated through a heating element incorporated in the windscreen washer reservoir. The hot water flow also applies heat to the windscreen washer feed tube and spray jets.
2. A de-icer system as claimed in claim 1 wherein the pumping pressure drop is provided by two uniform bore tee pieces sited a distance apart in the vehicle cabin heater hose.
3. A de-icer system as claimed in claim 1 or claim 2 wherein the heater element consists of a double skinned reservoir, with hot water circulated between the skins.
4. A de-icer system as claimed in claim 3 wherein the heater element is incorporated in the windscreen washer pump.
5. A de-icer system as claimed in claim 3 wherein the heater element is wound on the outside of the reservoir.



Application No: GB 9606598.2  
Claims searched: 1-5

Examiner: Tony Mitchell  
Date of search: 22 January 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:	
UK Cl (Ed.O): A4F (FAMC, FAMD)	
Int Cl (Ed.6): B60S 1/48	
Other:	

**Documents considered to be relevant:**

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2271276 A	(MACKAY) Note the engine cooling system connector nozzles 11, 15	1-3
X	US 4700424	(HAGEN) Note the line 11 connected to the cooling system return, column 2 lines 51-55	1
X	US 4090668	(KOCHENOUR) Note the engine coolant line 96	1,2
X	US 3888412	(LINDON)	1,2

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

